COLOR CONCEPTS
"EXACT" COLOR

By Gary G. Field (cont.)

them frequently, even if they have not yet reached the generous tolerance limits of the standard.

- Monitor the color matching acuity of those employees involved in colorimetric color matching situations. Use backup judgments to supplement that of those who exhibit change (we all do over time) or who deviate markedly from the norm. The Munsell Color Corporation's MatchPoint slide rule (formerly the Davidson and Hemmendinger Color Rule) is a good device to evaluate both the color matching differences between individuals and the changes over time for any given individual.
- Conduct frequent "color seminars" for customers that demonstrate the pitfalls of improper illuminants for color matching. The program also should explain how the color vision of key employees is evaluated and monitored. In so doing, this will usually inform the customer about the vagaries of his or her own color vision.

SOME RELATED FACTORS

Exact color is usually confirmed by making point-by-point colorimetric measurements of the original and reproduction. There are, however, some other factors that must be considered in order that an exact visual match be obtained.

- ***Substrate and surface characteristics.*** The smoothness, gloss, whiteness, brightness, and texture of the substrate should match or be compatible with the original. A watercolor painting must be reproduced on a non-glossy, textured substrate that simulates that used for the original painting. Glossy original photographs should be reproduced on a glossy substrate.
- ***Surround effects.*** The appearance of a single image within a catalog page will be influenced by the other images on the page. If direct comparisons for purposes of judging the "exactness" of the reproduction are made, the other images within the page should be covered with white paper.
- ***Angle of subtense.*** This a concern if the original image and the reproduction differ significantly in size. The subsequent visual field differences causes perceptual differences. If the comparison images differ by 100% or more, tone reproduction differences will have to be made to the reproduction in order to make it appear as an exact match to the original. In other words, they will appear the same despite the fact that some of the colorimetric values will differ.
- ***Scale effects.*** In order to accurately render the color of an automobile's paint scheme if it is reproduced in a magazine at, say, 1/32 scale, the equivalent of adding white (about 7–15%) to the original paint will be needed so that it looks natural in the reproduction. Scale model aircraft builders have conducted many color tests of this effect and have published some rough guidelines (Klaus, 1988). From an exact color point of view, this means that an "exact" match between a supplied color swatch and a reduced scale reproduction will result in a perceptually inaccurate print.
- ***Image definition.*** The halftone screen ruling must be sufficient to reproduce the detail in the original under standard viewing conditions. Sharpness, however, must be adjusted to suit the original in a manner that is part artistic and part scientific. A previous column discussed how image sharpness can affect color perception of a given area.

IN SUMMARY

There are cases where exact (colorimetric) color reproduction is desirable. Such an outcome may be impossible without the use of additional gamut-expanding inks.

Colorimetric reproduction is not without its challenges. Differences between observers, "standard" illuminants, image scale, image definition, and surface characteristics must all be corrected or taken into account before it can be said "This is an exact reproduction."